Missouri Botanical Garden

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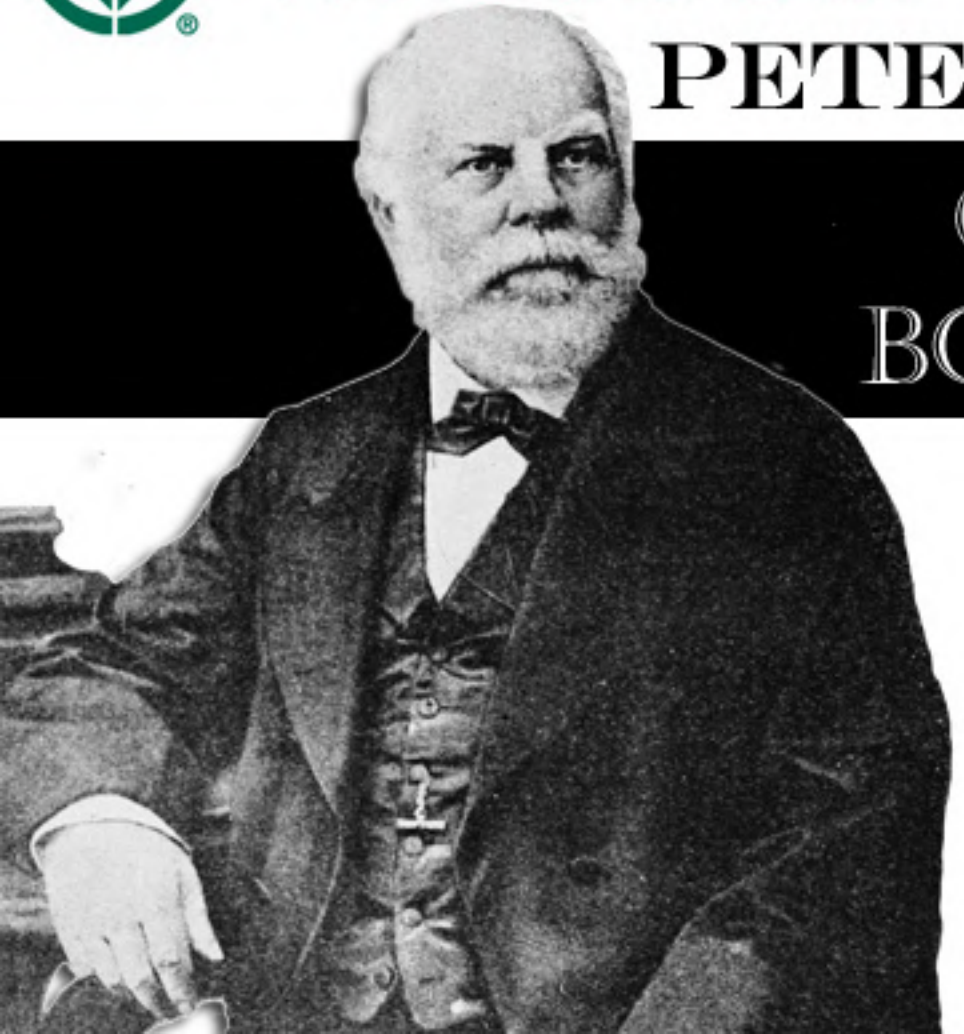
George Engelmann Botanical Notebooks



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INTRODUCTORY.

FEW families of Flowers are so generally known and admired as those embraced in the list of Bulbous-rooted Plants. The gaudy Tulip, the fragrant Hyacinth, the stately Lily, and the modest Snow Drop, are met with wherever the hand of Floriculture attempts to decorate some favored spot of mother Earth. They recommend themselves to universal favor by brilliancy and variety of color, by perfect hardiness, and ease of culture. But little care does the bulb require, when once deposited in the ground. Reviving spring calls forth its leaves and flowers, before its quickening influence is felt by other plants. The first-born children of the floral year, many of them are truly the pleasant stepping stones from dreary snow of winter to welcome verdure of spring.

The oft repeated complaint that flowers are so much trouble to take care of, cannot apply to them. They rise, and bloom, increase in numbers, and disappear again, without the aid of man. High culture may well advance them to perfection, but hardship cannot obstruct their vegetation; like onions

New England th[illegible] pendent of th[illegible]

in a climate presenting so many drawbacks to floriculture like this of ours, flowering plants succeeding surest with the least of labor, are ever foremost in public favor. The bulbous flowers, enumerated and described in the following pages, can justly claim more recognition and general culture than they have enjoyed heretofore. Coming into bloom earlier than most other flowers, before the dust and heat, so proverbial in our city, curtails this enjoyment of the garden, or the little pleasure ground surrounding almost every mansion, they are peculiarly well adapted to decoration of smaller city grounds. Their space is readily occupied by summer bedding plants, bought later in the markets. A two-fold crop of flowers is thus secured every season.

And shall we point the reader to the striking effect produced by a bed of brilliant Tulips, or fragrant Hyacinths, sprung up in early spring amidst the verdant lawn? Should they not be met with in every well-kept house yard throughout the city, enjoyed more by the owner and the passing world than scores of other costly decorations. With no impropriety the small but exquisite beautiful flowering frontyard, gracing the residence of W. D'Oench, Esq., situated on St. Ange Avenue, may here be mentioned, and be presented for imitation to dwellers in elegant marble front mansions, whose inward decorations are hid behind their costly curtains. Such an array of brilliant flowers in early spring, as well as throughout the season, naturally excites a thrill of joy in every passer by, and demonstrates most forcibly what beautiful effects can be produced by a judicious and liberal introduction of bulbous flowers in garden scenery.

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Tasteful arrangement in laying out of grounds, however large or small, is based on the principle of massing certain forms or colors, to contrast *en masse*, with as much effect as possible, from other forms or colors of another group. Let this be distinctly remembered when the question arises of how to plant the bulbs for next spring's blooming. A bed of Tulips, and another made up of Hyacinths, will show far better than a uniform mixture of both alike. And so in colors also, when kept distinct and separate from each other, the contrast is far more pleasing than when all are mixed.

Where bulbs are planted in larger quantities, the finest and most striking effect can be produced by a proper blending of kinds and colors, and the investment will be found quiet satisfactory, both in regard to brilliant display of flowers, and to increase of stock. A more general introduction of bulbous flowers in western pleasure grounds would lend to them an attraction and cheerfulness, little thought of at a season when bright flowers are most welcome and least expected.

Where but smaller purchases of bulbs are made, a judicious selection of the few cannot be urged too much. It is far better to procure a certain number of a few of the most brilliant and showy colors or kinds, suited to make a fine display or contrast, than to buy a few bulbs of most every kind, or a little of everything. Collections may be interesting to amateurs and connaisseurs, but they are decidedly of less advantage to those who wish a fine display for their front yards, regardless of name and kinds.

Let this distinction be fairly understood. We have selected our stock of imported bulbs with a view of supplying the demand for certain of the most showy colors, seen and admired so much in the floral display at Lafayette Park, through which much inquiry for certain kinds has already come to us. We trust to be able to supply the demand for such universal favorites, having ordered very largely of them.

Selections left to our discretion and judgment, will be filled to give perfect satisfaction.

Reliable and experienced workmen will be sent out by us, when desired, to attend to the proper planting of bulbs throughout the city.

The stock of bulbs offered to the western public through these pages, is the largest and best selected one ever received in our city. We import direct from one of the foremost houses of Haarlem in Holland, and can safely warrant all articles to be of the best quality, and true to name. The army of irresponsible bulb peddlars and runners from Europe having somewhat subsided of later years, to visit the western shore of the Mississippi, we may confidently hope that much of the vexation and disappointment caused by doubtful and indifferent articles, may be experienced no longer.

An invitation is tendered to all contemplating to beautify their grounds with bulbous flowers, to call in good season at our place of business, and to examine our stock.

MICHEL BROS. & KERN,

No. 107 North Fifth Street,

ST. LOUIS, MO.

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Phorad.

March 4 1872

Pollen x 415

usually globose

Bigelow № 3 on Populus

♂

4 – 7 joints

woolly

2 parts

= 4 parts

-- 4 parts

4 parts 2 flowers sometimes 2 parts occasionally

2 flowers coalescing (rare)

lobe and open anther x 10

4 – 7 flowers in a row

× 4

lower joints 2 × 5 series, upper 2 × 3 series of flowers

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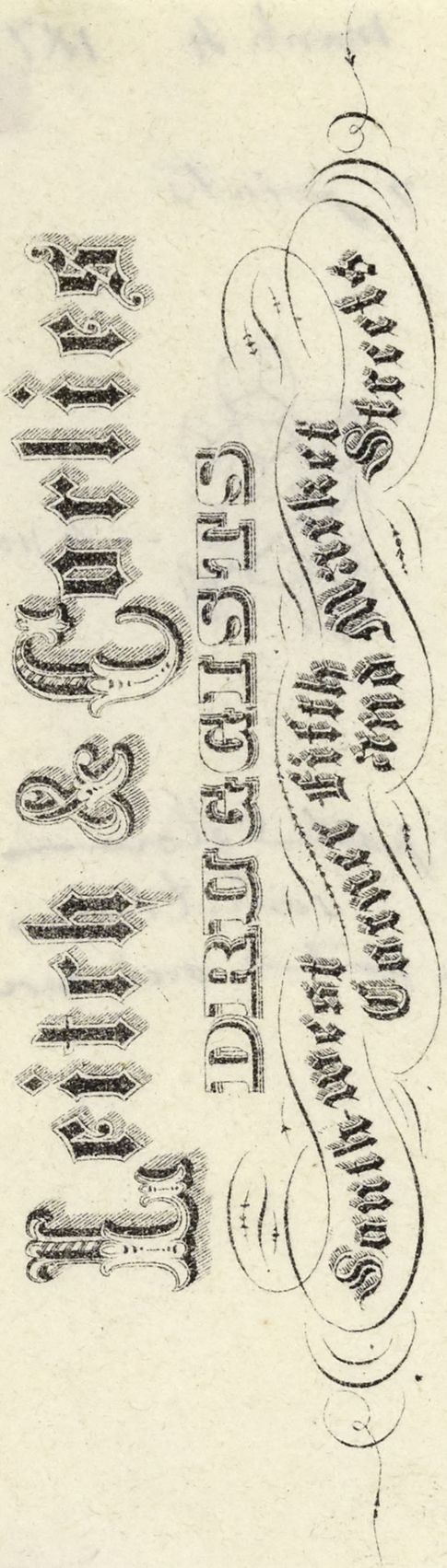

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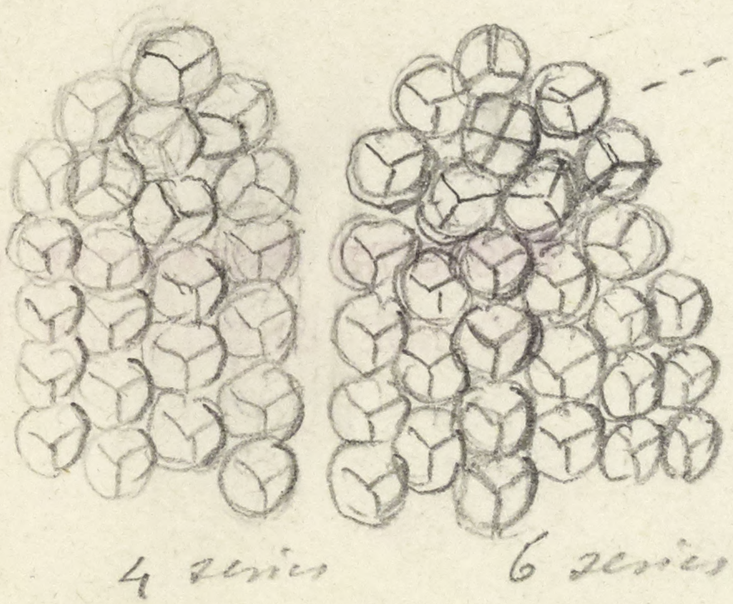
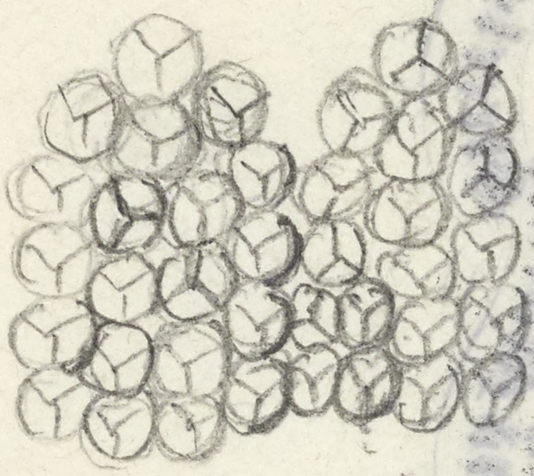
Rhoradendron

March 5 1872

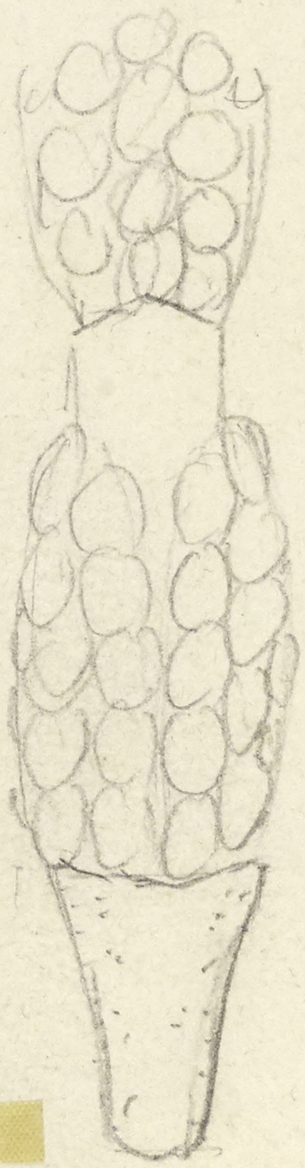
Pollen x 415

Linthaimer Texas R. exsic. 406 ♂





spicu ♂ 5-7 articul



Woolly

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Smith & Gallia
DRUGGISTS
Southwest Corner Fifth & Market Streets

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Smooth

Rhoradenia

March 5 1872

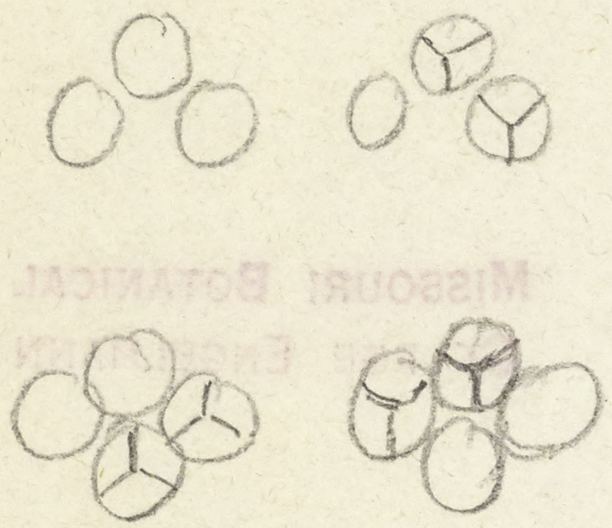
Rio Grande, New Mexico, Dr Wislizenus

on Populus

June 30

1846

×4



9

spike with 3-4 joints

joints 2×(3-4)flower

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ENGELMANN HERBARIUM
PLANTS OF NEW MEXICO

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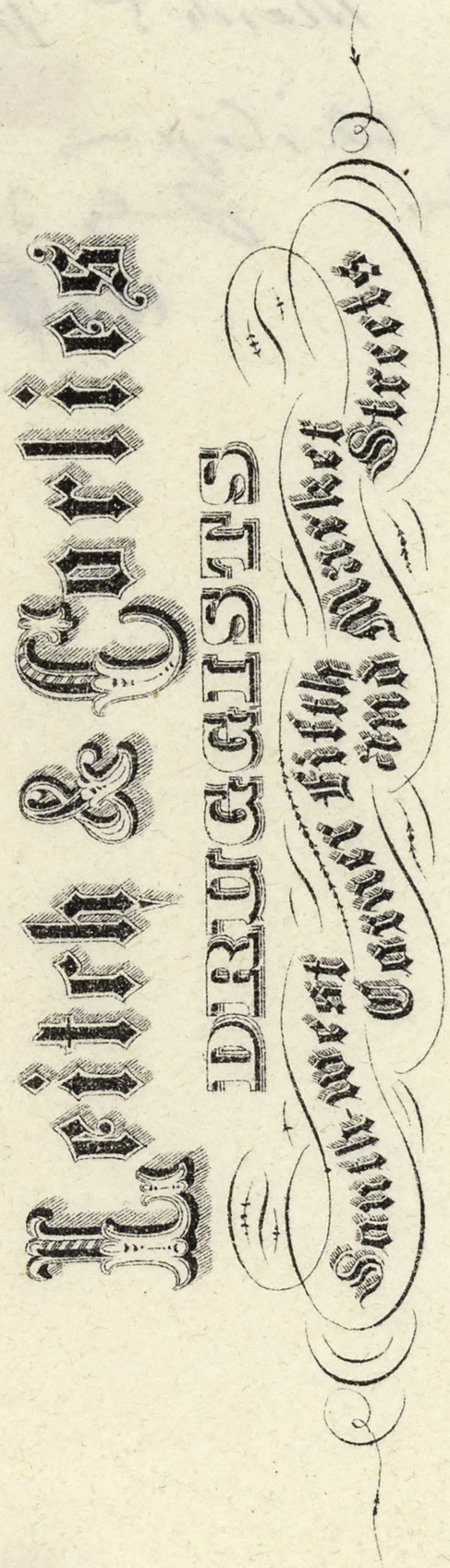

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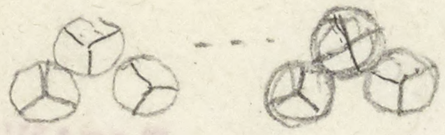
Rhododendron

March 5 1872

Linnaean Index 406 ♀

woolly

6 joints



x4

x 4

very

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Smith & Gmelin
DRUGGISTS
Corner Fifth and Market Streets

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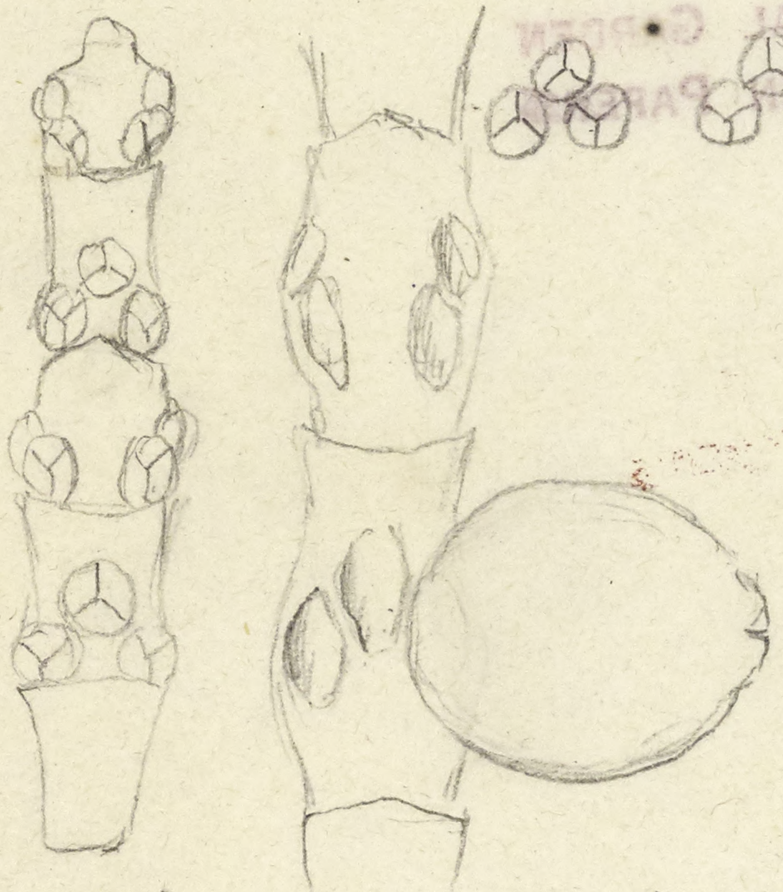
Phor. flavescens ♀

March 5 1872

Tendon, Memphis

smoother

×4



flower buds

nearly ripe fruit

×4

embryo

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ENGELMANN HERBARIUM
Missouri Botanical Garden
Engelmann Herbarium

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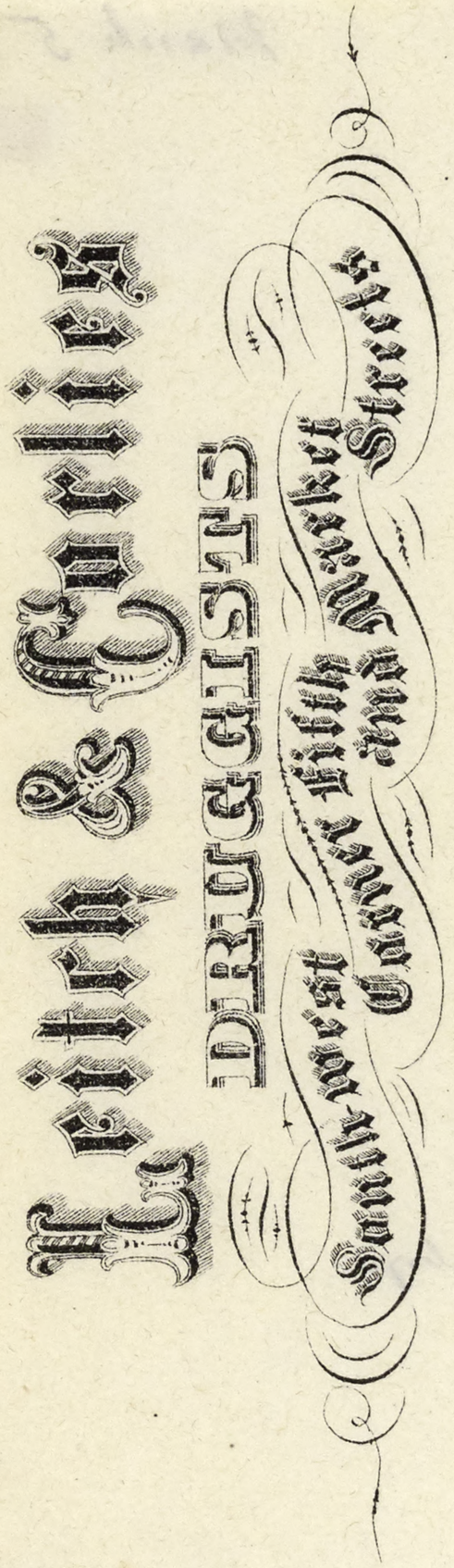

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Rhizophora flavoviridis ♀

March 5th 1872

Kniskern N Jersey

Smooth sh

spikes 3-4 pointed

X4

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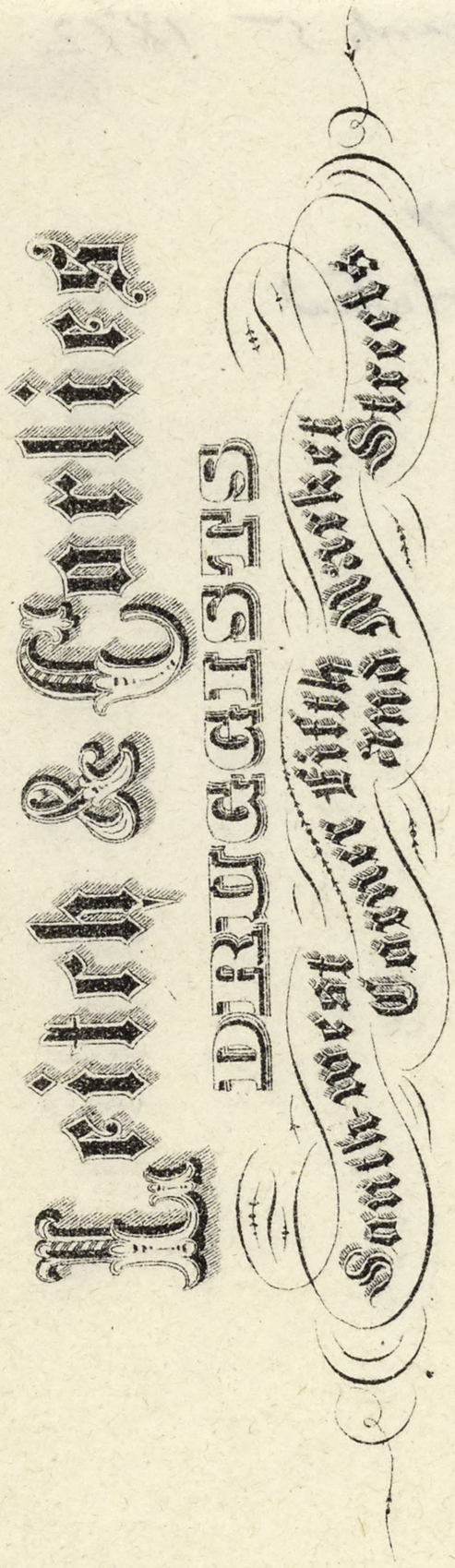

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March 6 1872

Ohio. Glaucous

On the banks of the Ohio

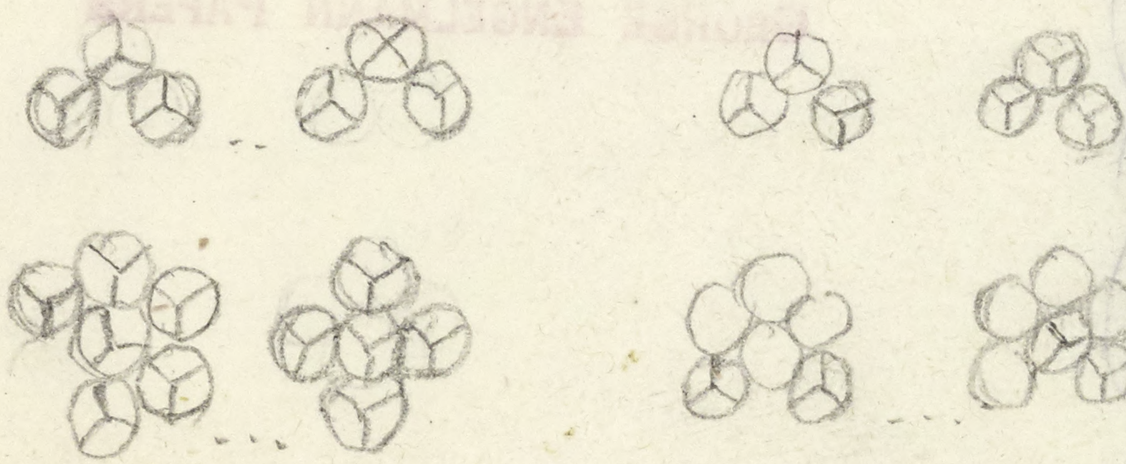
J. E. 1835 March

4 smooth sh

×4

joints 4 rarely 5 – each spike

flowers mostly ÷ 3°, lowest joint sometimes with 2 × (5–6) flowers



5 joints, rare,

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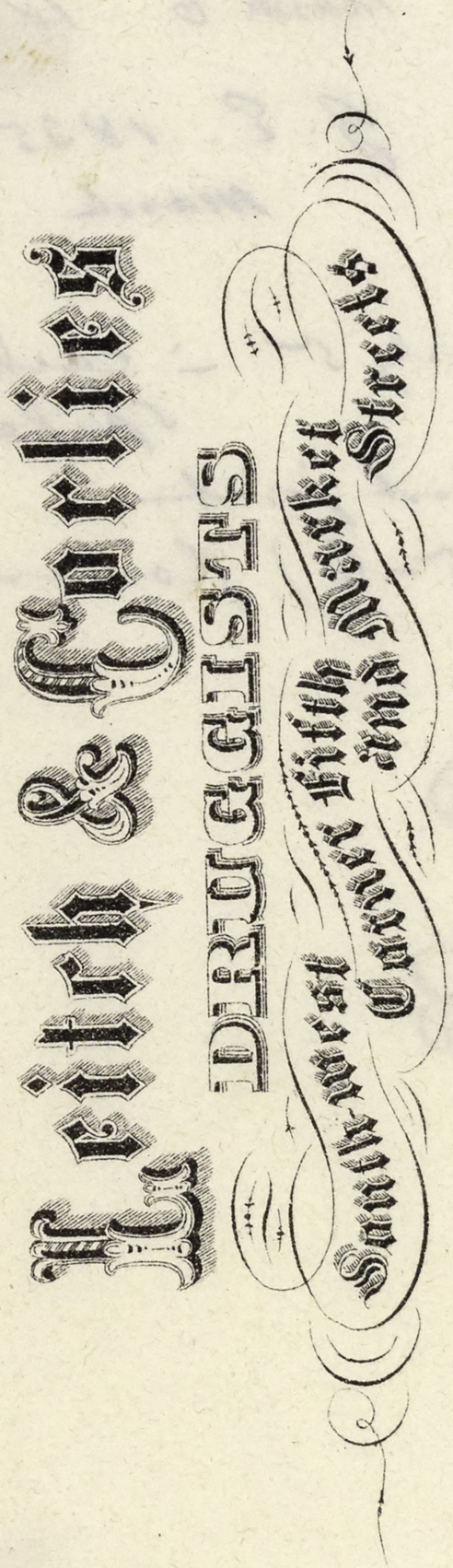

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Ph. flavescens

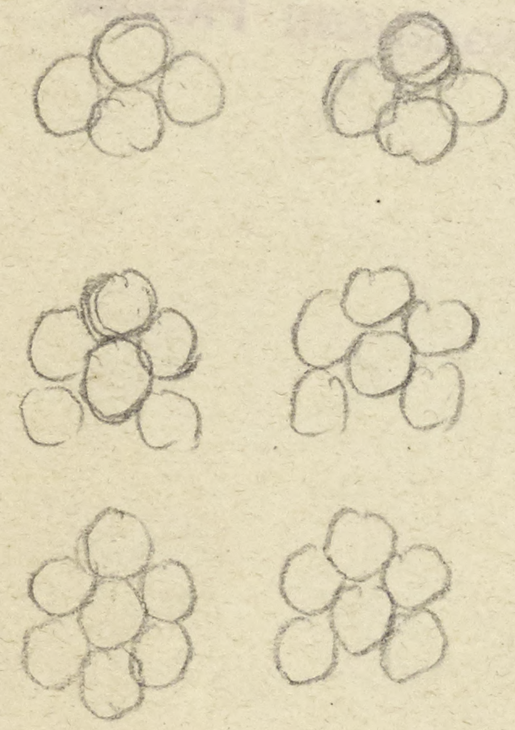
March 6. 1872

smoothish

Fernbanks Ohio, Short

spikes about 4 joints

♀



before flowering

embryo small scarcely protruding

ligneous endocarp incomplete laterally

fruit ripe?

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BOTANICAL GARDEN
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JONES & LEITCH,
DRUGGISTS
COR. FIFTH & MARKET STREETS,
ST. LOUIS, MO.

J. McKittrick & Co. Cor Main & Vine.

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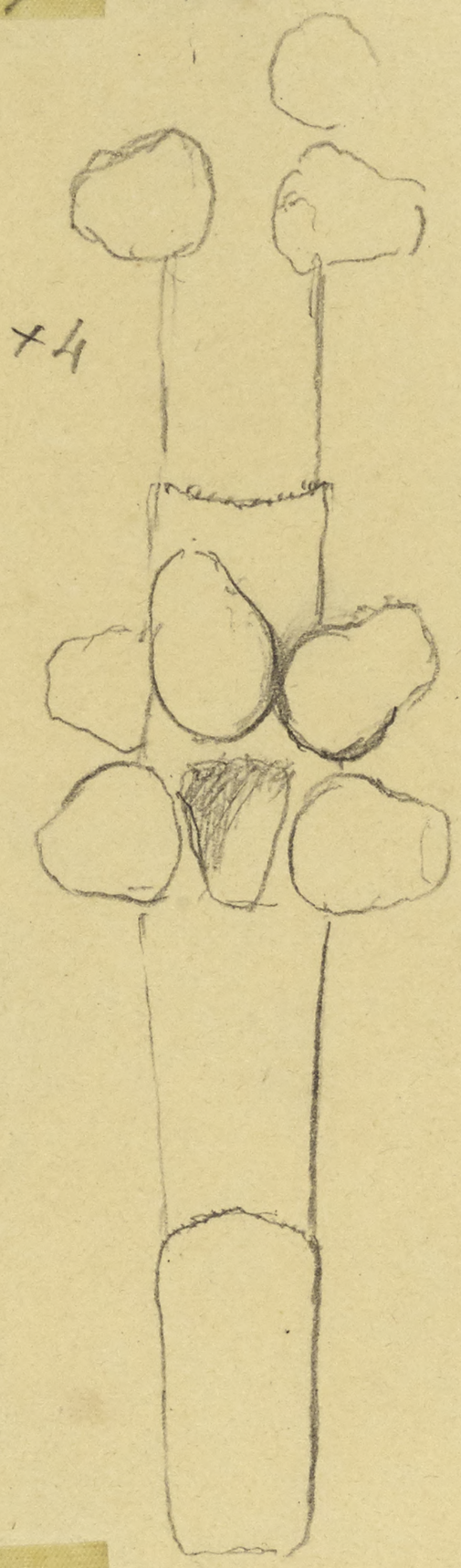
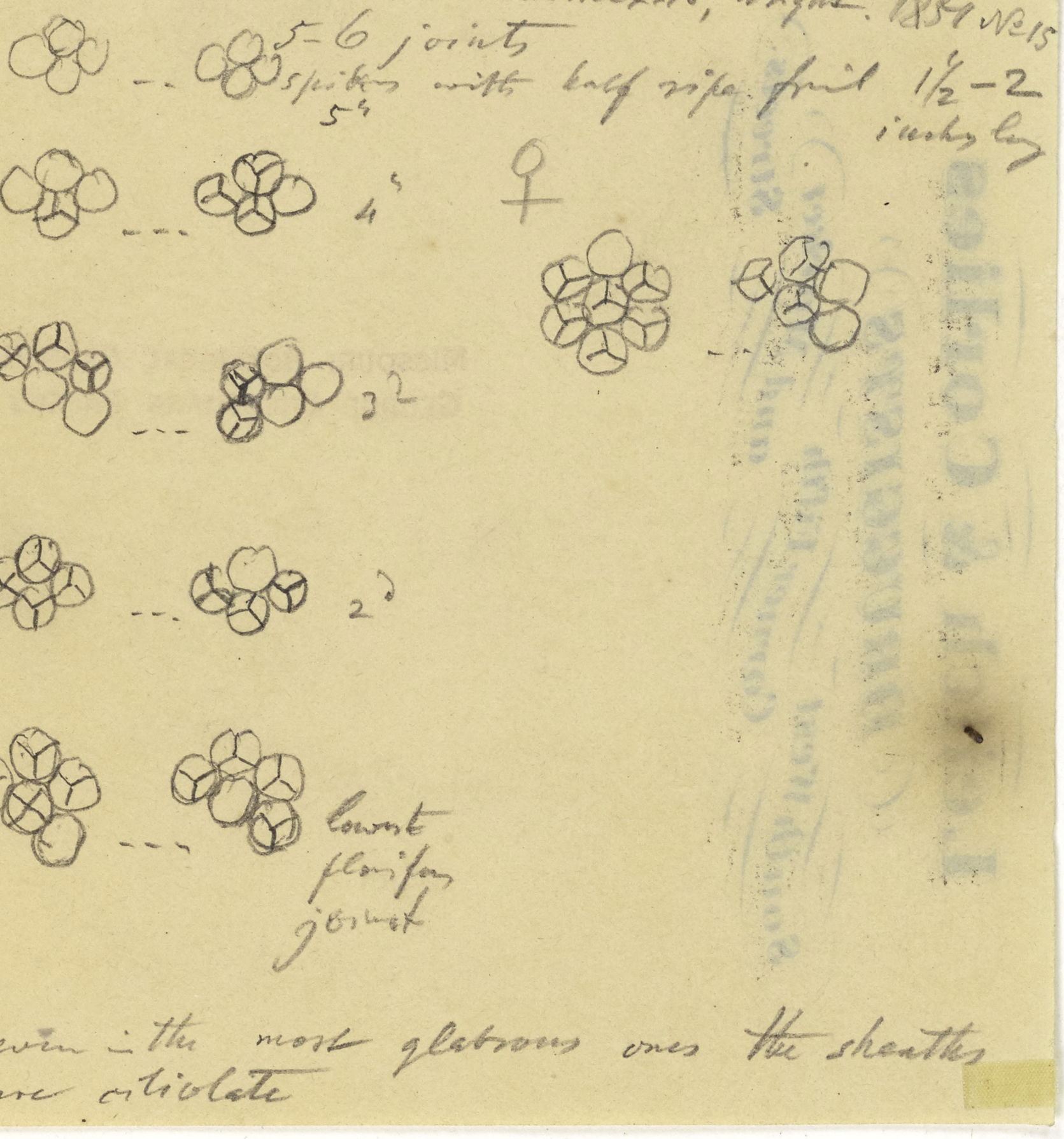
glabrous

March 1[illegible] 1872

New Mexico, Wright. 1851 No 15



+4



even in the most glabrous ones the sheaths are orbiculate

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GEORGE ENGELMANN PAPERS

Leitch & Corlies

CARRIAGE MANUFACTURERS

South West Corner Fifth and Market Streets.

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Thor. flavescens

Gainesville, Alabama, on Quercus

March 30th 1872

Mary Soulard March 72

×4

♀

×4

♂

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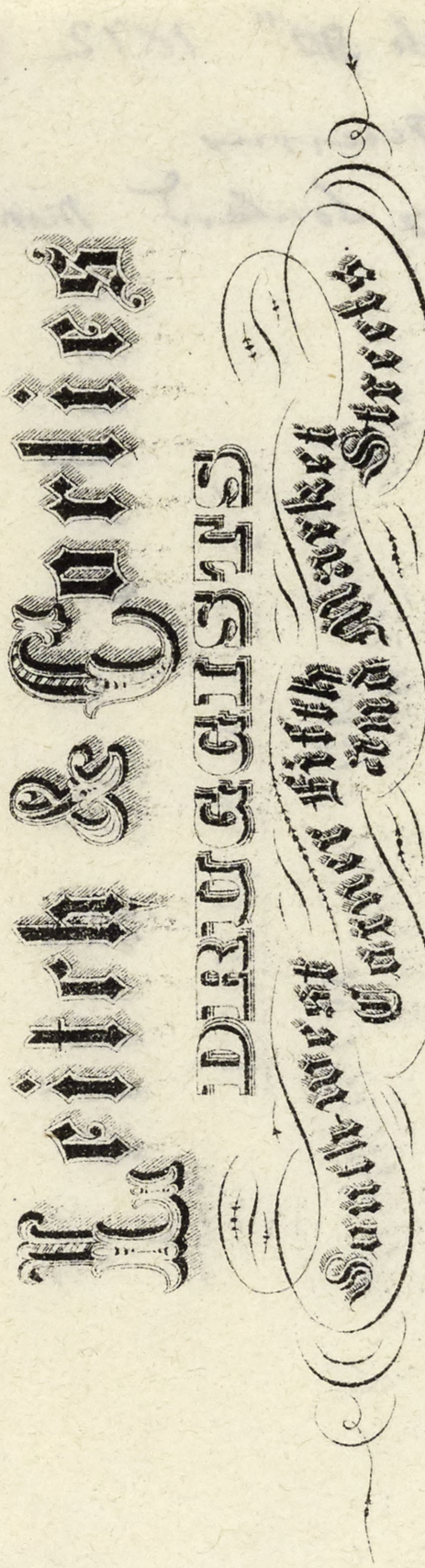

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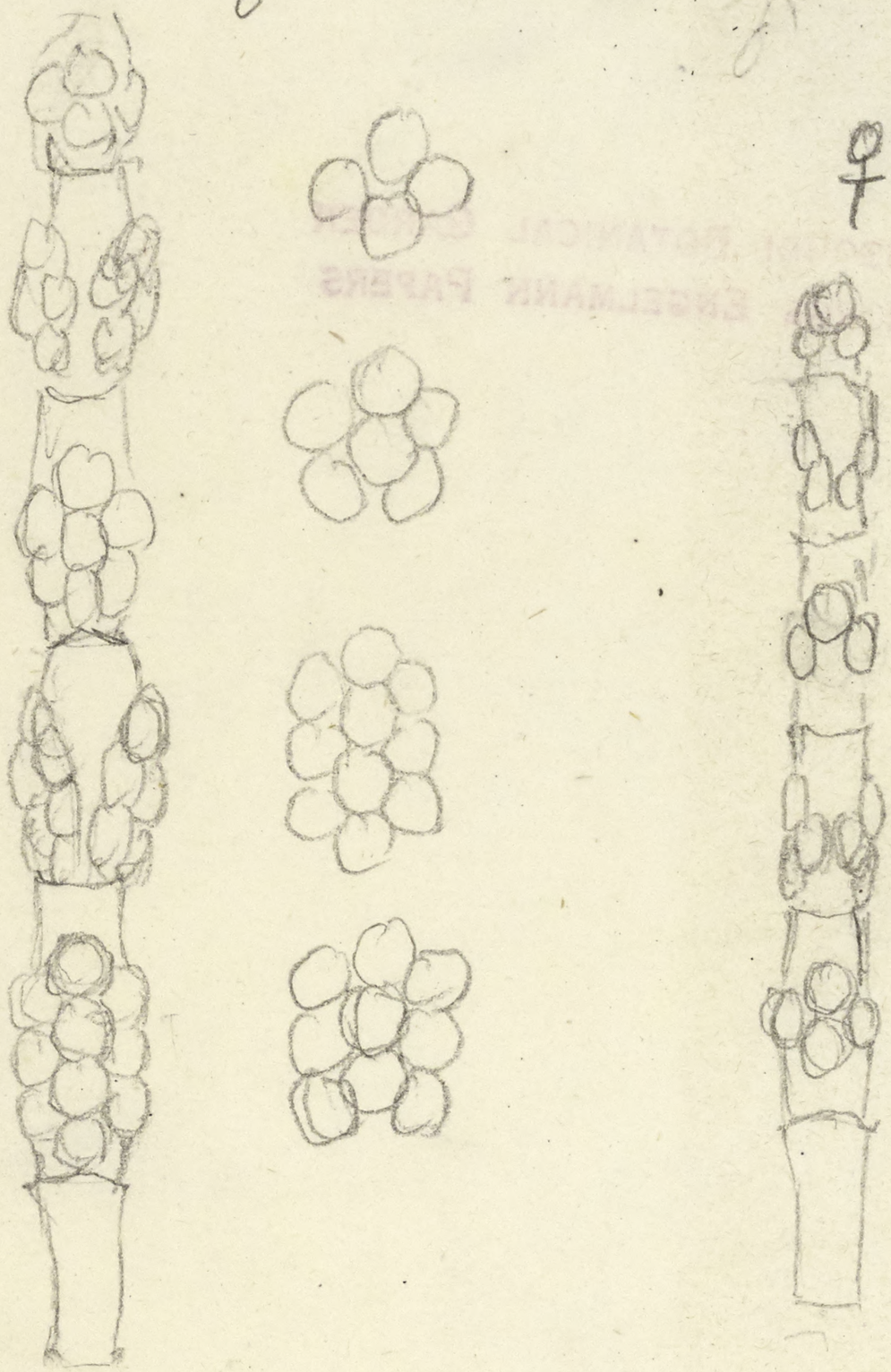
Phor. flavescens

April 12 1872

Gainesville Ala

Ft. Smith Ark

many Southward



♂

3 - 5 flowered
joint

♂ flowers in 3 ranks

2 × 3 (2 = 4)

usually 5 flowers
4 of the series

♀ 4 × 3 flowers

2 × 4

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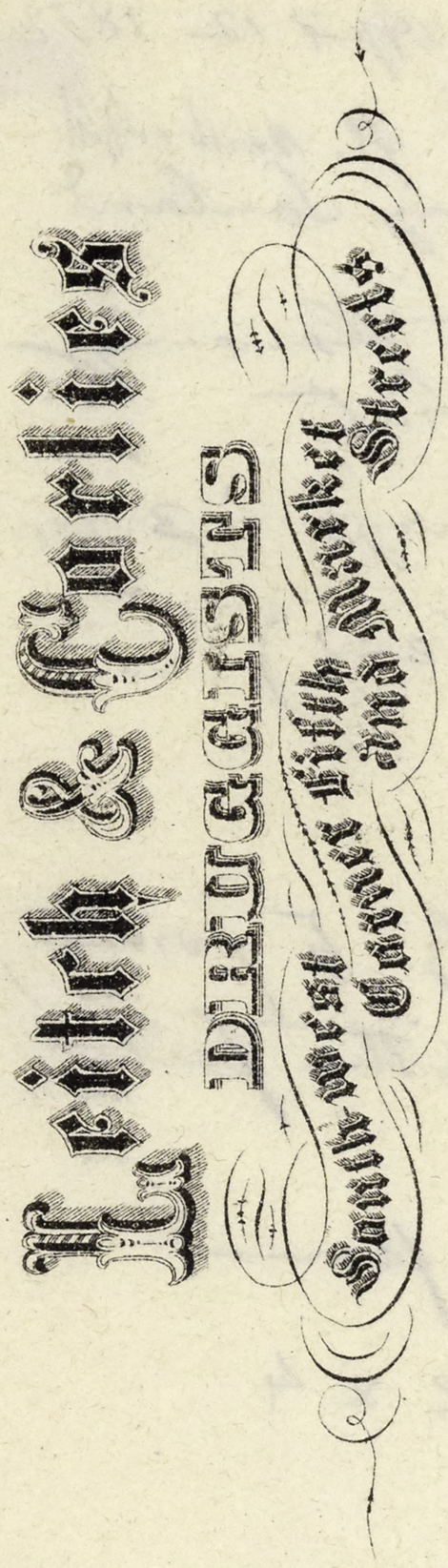

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Loranthaceae; Pollen, secundum Eichler.

Loranthee: granula adplurimum compressa triloba tristriata ut
sit Psittacanthus, Phrygilanthus, Phthirusa, Struthanthus
Pollen trigono-subglobosum, exina dodecaëdrico-reticulata
Oryctanthus

Viscaee
Pollen ellipticum vel subglobosum, dein de triporum et triporosum
exina laevi Phoradendron Dendrophthora

[Viscaee pollen globosum spinulosum

only Viscum & Arceuthobium seem to have
spinulose pollen grains

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ALEX. LEITCH,
APOTHECARY & PHARMACEUTIST,
Marble Building Cor. Fourth & Olive Sts. St. Louis, Mo.

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Phor. tomentosum

March 6 1872

woolly

♀

D. Greg 1867

Spikes 4–5 / joints

joints 2 × (3–4) ♂

seed

seat of fruit

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Smith & Ehrlich
DRUGGISTS
Corner Fifth and Market Streets
South-West

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woolly

Phor. tomentosum

♂

March 6 1852

Dr Gregg, 1847

×10

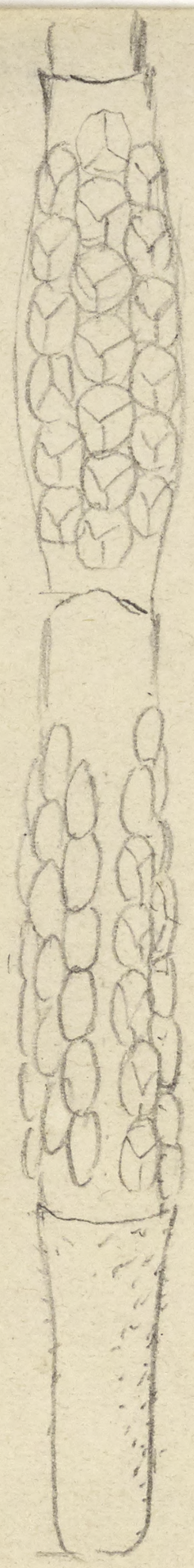
Disc & abortive ovary

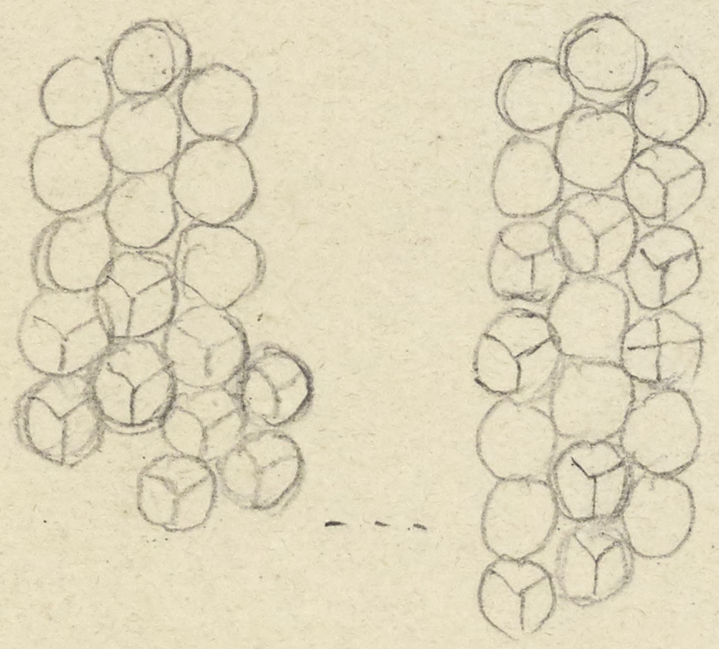
Pollen ×415

spikes 4–5 / axis

Crowds flowers of spike

open Calyx





series of flowers almost constantly 2×3

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46-50.

9

2-4 (rarely 5-6) joints in spike

not more than 3 rows of flow

1-7 flowers on each side

so that there are not more

than 14 usually not

more than 6 or 8 on a

joint

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Ea 67

366

VIII. PAPERS ON LORANTHACEÆ.

From Gray's Plantæ Fendlerianæ (Memoirs Amer. Academy, n. s., Vol. IV. 1849).

281. Phoradendron juniperinum, *Engelm. mss.* : glabrum, caule articulato divaricatim ramosissimo [58] ramisque teretibus ; ramulis compressis; foliis squamæformibus connatis truncatis vix cuspidatis pelviformibus breve ciliatis; spicis fœmineis lateralibus oppositis abbreviatis bifloris ; floribus bractea inferiore majore et duabus lateralibus in cupulam connatis ciliatis fultis globosis 3-(rarissime 4-)lobis. — "Parasitic on the two kinds of Shrub Cedar (Juniperus) which grow on the hills and elevated plains about Santa Fé, and on no other tree; sometimes forming clusters of more than a foot in diameter and three-fourths of a foot in height. Wherever they are found,

* Dr. Engelmann also contributed the article on Asclepiadeæ to Rothrock's Botany of Wheeler's Expedition, 1878, 187–189 ; but it contains no new species. Descriptions are given of *Philibertia cynanchoides*, Gray, *P. linearis*, var. *heterophylla*, Gray, *Asclepias involucrata*, Engelm., and *A. verticillata*, var. *subverticillata*, Gray.

A. euphorbiæfolia, *Engelm. in herb.*, is described by Gray in Contributions to North American Botany (Proceedings of the American Academy of Arts and Sciences, vol. xvi. 1880, p. 104). A. Sullivantii, *Engelm.*, is described in Gray's Manual, second edition, p. 352.

Gonolobus reticulatus, *Engelm. mss.*, is described by Gray (Proceedings of the American Academy of Arts and Sciences, vol. xii. 1876, p. 75). — Eds.

Mo. Bot. Garden
1904.

Perianthium 4-fidum ; *antheræ lobis totis adnatæ multicellulosæ, poris plurimis dehiscentes. Fl. fœm.* Calyx tubo cum ovario connato, margine integro, limbo obsoleto. Corolla 4-petala, summo calyci inserta. Ovarium inferum, uniloculare ; ovulo unico pendulo : stigma sessile, obtusum, subbilobum. Bacca pulposa, corolla persistente coronata, monosperma. — Frutices gerontogei, foliosi, parasitici ; foliis oppositis ; floribus masculis glomeratis terminalibus ; fœmineis in spicas articulatas breves terminales congestis, in quævis bracteæ axilla singulis.

I have examined only *Viscum album*, and based the characters on that species.

4. P. orbiculatum, *n. sp.* : ramis teretibus ; foliis orbiculatis s. ovato-orbiculatis breviter et abrupte petiolatis indistincte trinerviis pubescentibus demum glabratis ; spicis folio brevioribus puberulis, etc., ut supra. — On different species of *Quercus ;* on *Q. nigra*, sterile hills of Arkansas (*Engelm.*) ; on several oaks, San Felipe, Texas (*Lindheimer*). — Leaves on the older branches exactly orbicular, 6 to 10 lines in diameter ; young leaves somewhat longer than wide : petioles a line and a half long : flowers half a line in diameter.

5. P. tomentosum : tomentosum; ramis teretibus ; foliis obovatis s. oblanceolatis obtusis in petiolum brevem breve

cm 0 1 2 3 4 5 6 7 8 9 10
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PAPERS ON LORANTHACEA

...loring trees. The berry is globose, glossy, of
...The specimens are all fertile and in fruit; so tha
...of this there is little doubt, as the species is app
...hich is "parasitic on a *Strombocarpus*." (Prosopi
...ITCHCOCKI, *M. Bieb.*? (*A. gracile*, Engelm. mss.).

...CÆ LINDHEIMERIANÆ, PART II. (BOSTON JOURN

...TICUS (*Nutt.*): ramis teretibus; foliis oblanceol
...is trinerviis; spicis masculis subverticillatis foli
...is filio brevioribus, articulis 3–4, 4–10-floris;

...ently been briefly indi-
...Philad. n. ser. 1, p. 185),
...man when he communicated
...of Viscum, *Arceuthobium*, and
...some species of the latter, the
...ly changed to *Phoradendron*.

...liberi cimpanulati. *Fl. masc.*
...a foliis totis adnatæ multicellu-
...*Fl. fem.* Calyx tubo cum
...mbo obsoleto. Corolla 4-
...ovarium inferum, uniloculare;
...ma sessile, obtusum, subbilobum.
...ante coronata, monosperma. —
...positis; foliis oppositis; flori-
...ibus; fœmineis in spicas
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they abound on many neighboring trees. The berry is globose, glossy, of a light champagne color, with a tinge of red when dried." *Fendl.* — The specimens are all fertile and in fruit; so that it is not known whether the plant has the anthers of the genus, but of this there is little doubt, as the species is apparently too closely allied to the *Phoradendron Californicum*, Nutt., which is "parasitic on a *Strombocarpus*." (Prosopis).[1]

282. ARCEUTHOBIUM OXYCEDRI, *M. Bieb.?* (*A. gracile*, Engelm. mss.). 283. A. OXYCEDRI, *M. Bieb.?* [59] (*A. robustum*, Engelm. mss.)

FROM GRAY'S PLANTÆ LINDHEIMERIANÆ, PART II. (BOSTON JOURN. NAT. HISTORY, VOL. VI. 1850).

PHORADENDRON FLAVESCENS (*Nutt.*): ramis teretibus; foliis oblanceolatis obovatis nunc orbiculatis obtusis [212] in petiolum brevem attenuatis trinerviis; spicis masculis subverticillatis folium æquantibus, articulis 4–5, 15–35-floris; fœmineis suboppositis folio brevioribus, articulis 3–4, 4–10-floris; floribus depresso-globosis annulato-carinatis

[1] The genus *Phoradendron* has recently been briefly indicated by Nuttall (in Jour. Acad. Philad. n. ser. 1, p. 185), but was unknown to Dr. Engelmann when he communicated to me the subjoined characters of *Viscum*, *Arceuthobium*, and *Spiciviscum*, Engelm., and of some species of the latter, the name of which I have necessarily changed to *Phoradendron*.

1 VISCUM, *Linn.* Flores dicœci *campanulati*. *Fl. masc.* Perianthium 4-fidum; *antheræ lobis totis adnatæ multicellulosæ, poris plurimis dehiscentes*. *Fl. fœm.* Calyx tubo cum ovario connato, margine integro, limbo obsoleto. Corolla 4-petala, summo calyci inserta. Ovarium inferum, uniloculare; ovulo unico pendulo: stigma sessile, obtusum, subbilobum. Bacca pulposa, corolla persistente coronata, monosperma. — Frutices gerontogei, foliosi, parasitici; foliis oppositis; floribus masculis glomeratis terminalibus; fœmineis in spicas articulatas breves terminales congestis, in quævis bracteæ axilla singulis.

I have examined only *Viscum album*, and based the characters on that species.

2. SPICIVISCUM, *nov. gen.* [lege PHORADENDRON]. Flores dicœci *globosi*. *Fl. masc.* Perianthium 3-(raro 2- s. 4-)lobum; *antheræ lobis imis adnatæ, transverse biloculares, poris s. rimulis verticalibus duabus dehiscentes*. *Fl. fœm.* Perianthium 3-(raro 2- s. 4-)lobum. Ovarium inferum, uniloculare; ovulo unico pendulo: stigma sessile obtusum. Bacca pulposa, perianthio persistente coronata, monosperma. — Frutices Americani foliosi s. aphylli, parasitici; floribus in spicas axillares longiores interruptas articulatas s. abbreviatas dispositis, sæpe pluribus supra quævis bracteæ axillam rhachidi immersis; bracteis abbreviatis connatis vaginulam pelviformem formantibus.

3. ARCEUTHOBIUM, *M. Bieb.* Flores dicœci, *ovati, compressi*. *Fl. masc.* Perianthium tripartitum, *antheræ lobis mediis adnatæ, globosæ, uniloculares, rimula transversa dehiscentes*. *Fl. fœm.* Perianthium brevissime stipitatum, bidentatum. Ovarium inferum, uniloculare; ovulo unico pendulo: stigma sessile conicum. Bacca (pulposa?) corolla persistente coronata, monosperma. — Frutices gerontogei et Americani, aphylli, articulati; foliis ad squamas connatas pelviformes reductis; floribus axillaribus terminalibusque, masculis 1–3, fœmineis singulis.

PHORADENDRON, NUTT. [59]

* *Aphylla.*

1. [P. CALIFORNICUM, *Nutt. l. c.* Mountains of California. Perhaps same as the next.]

2. P. JUNIPERINUM, *Engelm. supra*. Santa Fé.

** *Foliosa.*

3. P. FLAVESCENS, *Nutt. l. c.*: ramis teretibus; foliis obovatis in petiolum attenuatis 3-nerviis, junioribus puberulis; spicis folio brevioribus; bracteis truncatis ciliatis; floribus in quovis articulo 6–10 depresso-globosis annulato-carinatis parce pubescentibus 3-(rarissime 2-)lobis. (*V. flavescens*, Pursh.) — On *Platanus* and *Ulmus*, in the woods of the lower Ohio and from there south; on *Populus*, along the Rio Grande below Santa Fé (*Dr. Wislizenus*). A well-known species; flowers half a line in diameter.

4. P. ORBICULATUM, *n. sp.*: ramis teretibus; foliis orbiculatis s. ovato-orbiculatis breviter et abrupte petiolatis indistincte trinerviis pubescentibus demum glabratis; spicis folio brevioribus puberulis, etc., ut supra. — On different species of *Quercus;* on *Q. nigra*, sterile hills of Arkansas (*Engelm.*); on several oaks, San Felipe, Texas (*Lindheimer*). — Leaves on the older branches exactly orbicular, 6 to 10 lines in diameter; young leaves somewhat longer than wide: petioles a line and a half long: flowers half a line in diameter.

5. P. TOMENTOSUM: tomentosum; ramis teretibus; foliis obovatis s. oblanceolatis obtusis in petiolum brevem breve attenuatis, senioribus subtus obscure trinerviis; spicis masculis folium longe superantibus; bracteis truncatis, articulis elongatis multi-(15-25-)floris; spicis fœmineis folio subbrevioribus oppositis s. verticillatis ad apicem caulis paniculatim congestis, articulis brevioribus sub 8-floris; floribus immersis depresso-globosis annulato-carinatis puberulis 3-(rarissime 4-)lobis. (*V. tomentosum*, DC. Prodr. 4. p. 670). On *Algarobia* and one or two other *Mimoseæ*, near Rinconada, Northern Mexico, *Dr. Gregg*. — No doubt the same as De Candolle's plant, which was collected in Northern Mexico by Berlandier, also on *Mimoseæ*. Leaves an inch or one and a quarter long, and half as wide. Sterile spikes one and a half to two and a half inches long: female spikes only about an inch long: flowers very similar to those of both the foregoing species, and of the same size or rather smaller. Fruiting spikes slightly elongated, an inch to an inch and a half long: berries one line and three-fourths to two lines in diameter.

6. P. LANCEOLATUM, *n. sp.*: glaberrimum; ramis teretibus; foliis lanceolatis elongatis subfalcatis obtusiusculis in petiolum brevissimum sensim attenuatis 3–5-nerviis; spicis masculis folio brevioribus; bracteis triangularibus connatis; articulis 8–18-floris; floribus immersis globosis 3-(rarius 4-)lobis. — On "Live-Oak," Rinconada, *Dr. Gregg*. — Leaves 3 inches long, half an inch wide: sterile spikes an inch and a half to two inches long. Flowers less than a line in diameter; distinguished from those of the foregoing species by being destitute of the horizontal edge, and entirely glabrous, as is the whole plant. Anthers very distinct, similar to the common form of two-celled anthers, opening longitudinally, while in the other species they open by two pores. — Apparently near *V. Schiedeanum*, DC., but distinguished by the terete branches.

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ciliatis subtrifidis. — Var. *a.* GLABRIUSCULUM : foliis oblanceolatis seu obovatis 3-nerviis in petiolum sensim attenuatis glabris; ramis junioribus puberulis. — *β.* PUBESCENS: foliis ut in *a.*, sed puberulis ; ramulis canescentibus. — *γ.* ORBICULATUM (*Ph. orbiculatum*, Engelm. Pl. Fendl.) : foliis obovato-orbiculatis in petiolum brevem abrupte contractis vix trinerviis subpubescentibus. — New Jersey to Southern Missouri and New Mexico, and south to Texas. Var. *a.* is the more northern form, mostly in low woods along water-courses ; *β.* in damp places on *Ulmus*, *Algarobia*, and also *Quercus falcata*, near New Braunfels, San Antonio, etc.; *γ.* in Texas and Arkansas on dry sterile land, on *Quercus nigra* and other oaks. Flowers, December to March ; fruit ripens the following winter.

The nearly related *Phoradendron tomentosum*, from south of the Rio Grande, has smaller leaves, longer spikes, etc. *Phoradendron villosum* of Oregon has much smaller and spatulate tomentose leaves, etc.

I take this opportunity to make some corrections and additions to my paper on *Viscum* and the related genera, printed as a note in Plantæ Fendlerianæ, pp. 58, 59.

I. VISCUM. . . . . Bacca globosa, pulposa, semipellucida, monosperma, corolla persistente coronata.

II. PHORADENDRON, *Nutt.* Flores dicœci, globosi. *Fl. masc.* Perianthium 3-(raro 2-s. 4-)lobum : antheræ loborum basi adnatæ, transversæ, biloculares, poris s. rimis verticalibus duabus dehiscentes. *Fl. fœm.* Perianthium 3-(rare 2–4-)lobum: ovarium inferum, tubo adnatum, uniloculare ; ovulo unico pendulo. Stigma sessile, plus minus bilobum. Bacca globosa, pulposa, semipellucida, monosperma, perigonio persistente coronata. — Frutices Americani, etc.

* *Foliosa ;* foliis lamina dilatata basi attenuatis ; spicis fœmineis plus minus elongatis ex articulis pluribus plurifloris constitutis.

1. PHORADENDRON FLAVESCENS, *Pursh*, sub Visco. Vide supra.

2. PH. TOMENTOSUM, *DC.*, sub Visco.

3. PH. VILLOSUM, *Nutt.*, sub Visco : tomentosum ; ramis teretibus ; foliis oblanceolatis s. spathulatis obtusis in petiolum brevem attenuatis obscure trinerviis s. subenerviis ; spicis fœmineis oppositis s. verticillatis abbreviatis 2–3-articulatis ; bracteis truncatis; articulis brevibus, inferiore 6–8-floro, superiore 2-floro ; floribus depresso-globosis annulato-carinatis puberulis 3-fidis. — Wahlamet Woods, Oregon, *Nuttall.* — Leaves 8–12 lines long, 3–4 lines wide. Spikes 3–4 lines long. Flowers 0.5–0.6 of a line in diameter, like those of the two foregoing species depressed, with an almost annular, ciliate carina. Stigma conspicuously bifid. — The narrow, long, attenuate [213] leaves and the short spikes distinguish it from *Ph. tomentosum.*

5. PH. LANCEOLATUM, *Engelm. in Plant. Fendl.*

* * *Squamosa ;* foliis in squamulas connatas pelviformes reductis ; spicis fœmineis ex articulis paucis 1–2-floris constitutis.

6. PH. CALIFORNICUM, *Nutt.* : glabrum; ramis elongatis strictis gracilibus teretibus ; squamis ovato-lanceolatis patentibus basi connatis tenuiter ciliatis; spicis fœmineis lateralibus oppositis 3–4-floris ; floribus globosis trifidis glabris in quovis articulo singulis s. binis cupulæ ciliatæ immersis ; spicis fructiferis elongatis ; baccis globosis. — Sierra Nevada of California, on some species of *Strombocarpus*, Dr. Gambel. Intermediate and connecting the leafy and scaly species of this genus, though properly belonging to the latter. Scales longer than the diameter of the branch, patulous. Branches a foot or more long (*Nuttall*) ; ultimate joints 7–9 lines long ; flowering spikes about 3 lines, and fruiting spikes 9 lines long. Fruit 3 lines in diameter. Flowering spikes with 2 lateral linear-lanceolate ciliate bracts at base, consisting of 3 joints, the lower being always sterile, the two upper ones producing each two or by abortion single flowers. In the fruit-bearing spike these joints are in such a manner elongated that the (typically axillary) fruit is carried up to the top of the joint, just below the next pair of leaves (or scales). Stigma globose, very slightly bilobed.

7. PH. JUNIPERINUM, *Engelm. in Plant. Fendl.*

III. ARCEUTHOBIUM, *M. Bieb.* Flores dicœci, ovati compressi. *Fl. masc.* Perianthium 3-(raro 4-)partitum. Antheræ lobis mediis adnatæ, unicellulosæ, rima transversa dehiscentes. *Fl. fœm.* Perianthium breviter pedicellatum, 2-(raro 3-)dentatum : ovarium inferum, tubo adnatum, uniloculare ; ovulo unico pendulo. Stigma sessile, conicum. Bacca carnosa, opaca, ovata, compressa, perigonio persistente coronata. — Frutices gerontogei et Americani glaberrimi, aphylli, articulati ; foliis squamæformibus in vaginulas pelviformes s. cupuliformes connatis ; floribus axillaribus terminalibusque sæpe spicam simplicem s. compositam mentientibus ; fl. masculis 1–3 sessilibus, fœmineis plerumque singulis brevissime incluso-pedicellatis ; baccis perigonio aucto plerumque discolore coronatis sæpius exserte pedicellatis extus carnosis intus viscidis.

1. A. OXYCEDRI, *M. Bieb.* : caule ramisque oppositis s. dichotomis compresso-teretibus gracilibus strictis ; ramulis ultimis compresso-subquadrangulatis ; squamis triangularibus in vaginulas pelviformes connatis ; floribus fœmineis in ultimis ramulorum articulis axillaribus terminalibusque in quavis axilla singulis s. binis ; baccis exserto-pedicellatis, erectis. — Southern Europe, etc. The specimen before me is from Fiume. — Lowest joints of the ultimate

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...sterile; the next joint producing two l...
...usual state probably is, where only...
...next below two lateral flowers; that is the state...
...three or four joints, one or two in the specimen before...
...enclosed pedicels, which apparently are elo...
...not seen) half the length of the fruit.

2. A. AMERICANUM, *Nutt.*...
vaginulas dilatatas cupulifor...
Pinus, Nuttall. — Consid...
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branchlets sterile; the next joint producing two leaf-buds; the 2 to 4 following joints bearing flowers, one of which is terminal. The usual state probably is, where only the last two joints bear flowers, the ultimate one a terminal, and the next below two lateral flowers; that is the state described by DeCandolle; "floribus fœmineis ad ramulorum apices tribus." But in the specimen before me most branchlets bear from 5 to 9 flowers, on the last [214] three or four joints, one or two in each axilla. Flowers minute, 0.3 of a line wide and 0.4 long, on very short, enclosed pedicels, which apparently are elongated immediately after flowering. Pedicel of the young fruit (ripe fruits not seen) half the length of the fruit.

2. A. AMERICANUM, *Nutt.*: caule ramisque fasciculatis teretibus gracilibus patulis; squamis truncatis in vaginulas dilatatas cupuliformes connatis; floribus masculis axillaribus terminalibusque nec spicatis. — Oregon, on *Pinus*, Nuttall. — Considerably resembling the slender forms of var. *a.* of the next species, but smaller, slenderer, and at once distinguished by the terete branches, the fasciculated branchlets, and much dilated vaginulæ. Female plant and fruit unknown to me.

3. A. CAMPYLOPODUM, *n. sp.*: ramis oppositis seu dichotomis compresso-quadrangulatis; squamis truncatis breviter cuspidatis in vaginulas subcylindricas cupuliformes connatis; floribus axillaribus terminalibusque plerumque in spicam simplicem s. compositam aggregatis, masculis singulis vel binis ternisve, fœmineis in quavis axilla singulis; baccis exserto-pedicellatis patulis s. recurvis. — Var. *α.* MACRARTHRON: caule compresso vix angulato; ramis plerumque gracilioribus; articulis plus minus elongatis; floribus fœmineis sparsis et in ramulis brevibus paucis seu in spicas simplices aggregatis. — *β.* ? BRACHYARTHRON: caule tereti robusto; ramis robustis articulis abbreviatis diametro vix longioribus; floribus fœmineis in spicas densas compositas aggregatis. — I have comprised under this name different forms, which, when better known, will probably have to be separated as distinct species. My specimens are so incomplete that I cannot even satisfactorily determine whether the different forms which constitute the first of the two varieties will finally be retained under one species. — Var. *α.* has been found in Oregon (only on *Pinus ponderosa*), *Geyer;* in New Mexico (only on *Pinus edulis*), *Fendler*, 282; and in California, *Douglas.* — The specimens from New Mexico (only male and female flowers seen) have short female spikes, bearing 2 to 5 flowers, or the flowers are scattered on the branchlets: the flowers are elliptical, 0.4 line wide and 0.5 long, almost sessile. Geyer's Oregon plant (I have seen only a fruiting specimen) has more elongated many-flowered female spikes; the flowers apparently ovate; pedicel hardly one-third the length of the (not quite ripe) fruit. The Californian plant (male and female flowers and fruit) is much stouter: male flowers twice as large as in the specimens from New Mexico, and not rarely 4-parted; female flowers in more elongated spikes, elliptico-orbicular, small, 0.4 to 0.5 line in diameter; the recurved pedicel more than half the length of the fruit, which is 2 lines long and 1.3 wide. — Var. ? *β.* has been collected in Mexico by Coulter. I can hardly doubt it to be a distinct species; but my means to distinguish it are at present too limited. The stout terete stem, the short joints which are hardly longer than wide, the crowded compound or panicled spikes which resemble those of the following species, and the larger ovate (not elliptical) flowers appear to indicate specific distinction. Fem. flowers 0.6 line wide and 0.8 line long; fruit 2 lines long and 1.2 lines in transverse diameter, the pedicel more than half as long as the fruit: male flowers not seen.

4. A. CRYPTOPODUM, *n. sp.*: caule ramisque acute quadrangulatis robustis articulis brevioribus; squamis truncatis in vaginulas cupulatas connatis; floribus in spicas densas compositas congestis, fœmineis ovatis in quavis axilla singulis; baccis brevissime incluso-pedicellatis erectis. — Santa Fé, only on *Pinus brachyptera*, A. [215] Fendler, No. 283. — Hooker's *A. Oxycedri* from the Hudson Bay country appears to belong here: the figure shows at least subsessile, erect fruits; but the segments of the male flowers are broadly oval, while those of the New Mexican plant are lanceolate.

FROM THE TRANSACTIONS OF THE ACADEMY OF SCIENCE OF ST. LOUIS, VOL. III. 1873.

Dr. Engelmann exhibited a living specimen of the Black Spruce (*Abies nigra*) fresh from the Adiron- [lxxxiii] dacks of New York, infected with a diminutive parasite of the mistletoe family, which he had named *Arceuthobium minutum*. All the species of this genus inhabit Conifers. One occurs on Junipers in the Mediterranean and Caucasus regions of the Old World. A second was found by Humboldt on Pines on the highest mountains of Mexico; and several more have been found since on our Rocky Mountains and westward, mostly also on Pines. The peculiarity of this species, discovered about the same time last summer, by two different persons in different parts of the State of New York, besides its spring flowering (all the others being autumnal), consists in the occurrence of the sexes in distinct colonies in different trees, male and female plants never, thus far, having been found together on the same trees; and in the great abundance of individuals on these trees, where the flowering plants almost always occupy the three-year-old branchlets, while the two-year-old ones exhibit germinating plantlets like small knots. The necessary inference is that these parasites are propagated, or we should rather say multiplied, by stolon-like fibres, almost analogous to the mycelium of Fungi, spreading under the bark of the growing branches and always from the older to the younger

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ones, rather than by seeds, which, though abundant enough, could not produce such a copious and regular crop, and invariably of one or the other sex only. Dr. Engelmann had been elaborating a monograph of this curious genus, which he would offer to the Academy for publication. — *Journal of Proceedings*, May 20, 1872.

FROM THE REPORT ON THE UNITED STATES GEOGRAPHICAL SURVEYS WEST OF THE ONE HUNDREDTH MERIDIAN, LIEUT. GEORGE M. WHEELER IN CHARGE, VOL. VI., BOTANY, BY J. T. ROTHROCK, 1878.

PHORADENDRON FLAVESCENS, *Nutt.* — The collection contains a number of specimens, which represent two distinct forms, different from the common Eastern type. The first may be characterized as var. MACROPHYL- [252]
LUM, with large orbicular-obovate, glabrate leaves, only in the young state with an evanescent pubescence, 1½–2½ inches long, 3- and often 5-nerved; staminate spikes unusually thick, with 4 or 5 short joints, each with 10–40, comparatively large, pubescent flowers. — They grow on soft woods (Ash, Willow, Poplar, Sycamore, and Sapindus) on the Gila and Bonita Rivers, and extend into Southern California, *G. K. Gilbert, Dr. Rothrock.*

Var. VILLOSUM (*Phor. villosum*, Nutt.), with woolly, obovate, and var. ORBICULATUM, with rounded, pubescent leaves, are found on hard woods, principally on oaks, in Oregon, California, Arizona, and southeastward. On the mountains about Camp Apache, Arizona, they grow on different varieties of *Quercus undulata.*

PHORADENDRON CALIFORNICUM, *Nutt. Pl. Gambel. p.* 185. — Slender, terete, much-branched, leafless stems, 1–2 feet long, bearing, in the axils of the opposite, connate, acute, spreading scales, numerous short, pubescent, 1- or few-jointed spikes, each joint with 2–6 flowers; staminate flowers with oblong anthers, the cells opening longitudinally. — Arizona and Southern California, *G. K. Gilbert, Dr. Rothrock,* on *Mimoseæ, Larrea,* and a few other shrubs.

PHORADENDRON JUNIPERINUM, *Engelm. Pl. Fendl. p.* 58. — Half a foot to a span high, densely branched; small, obtusish leaf-scales ciliate; staminate spikes very short, mostly with a single 6–8-flowered joint, pistillate ones with only two opposite flowers. — Common on different species of Juniper throughout Arizona and in the adjacent districts; collected by all the different Expeditions. The short joints are so fragile that the dried specimens easily break up.

ARCEUTHOBIUM AMERICANUM, *Nutt.; Engelm. Pl. Lindh.* 214. — Slender, dichotomously and verticil- [253]
lately much branched, greenish-yellow; staminate plants, 2–4 inches high, ¼–1 line thick at base; fertile plants much smaller; flowers small, staminate ones 1 line wide, lobes ovate-orbicular, acutish; pistillate flowers ½–1 line, fruit 2 lines long. — Only on *Pinus contorta*, Rocky Mountains to Oregon and California; near Breckenridge, at 10,000 feet altitude, *Wolf*, 1873. Flowers late in autumn. — In this and the next species, accessory flowers or flowering branchlets are developed on the fruiting specimens, in this lateral, in the next dorsal to the fruits or fruiting branches. In these two we find no other secondary formation on the fertile plants, but in the other species sterile branchlets are developed on them which would flower in the following year; thus these latter continue their existence for a longer time than the first two.

ARCEUTHOBIUM DOUGLASII, *Engelm. ined.* — Slender, small, ¼–1 inch high, greenish-yellow, dichotomously branched; branches suberect, single or with accessory ones behind the first; flowers in short, usually 5-flowered spikes, staminate ones less than 1 line wide, with orbicular-ovate acutish lobes; fruit 2½ lines long. — On *Pseudotsuga Douglasii* from New Mexico (on Santa Fé River, *Rothrock*, No. 69, 1874) to Utah, *Parry, Siler*, and Northern Arizona, Camp Apache, *G. K. Gilbert* (109), 1873. — Flowers, May and June. — Similar to the last, but smaller, and never with verticillate branchlets or flowers, which are so common in that species. The thallus-like tissue or stroma, which creeps along within the bark of the nurse-plant, buds out in autumn all along the three-years-old shoot; after about twelve months, the flower-buds are formed, to open in the following spring, after which the life of the male plant is exhausted; but it takes another year to perfect the fruit. The female parasite, now fully three years old, generally dies, but sometimes lives and fructifies another season. The Northeastern *A. pusillum*, Peck, behaves in the same manner, while in *A. Americanum* and some other species the buds of the parasite make their appearance at first only among the older bud-scales of the pine branch.

Var.? MICROCARPUM is parasitic on *Picea Engelmanni*, found by Mr. Gilbert in 1873 (100 and 102) in the Sierra Blanca, Arizona; it is a little taller, 1–2 inches high, but has much smaller fruit, only 1¾ lines long, the smallest of any American species.

ARCEUTHOBIUM DIVARICATUM, *Engelm. ined. A. campylopodum*, var., Engelm. Pl. Lindh. — Much stouter [254]
than the last, 2–4 inches high, below 1 line in diameter, olive-green or light brownish; branches spreading, often recurved; staminate flowers few and scattered, or in 3–7-flowered spikes, 1 line in diameter, with ovate, acute lobes; inflorescence often bearing sterile branches from the same axils as the fruiting ones and behind them; fruit 1½–1¾ lines long.

On Nut-pines (*P. edulis* and *monophyllos*) from Southern Colorado through New Mexico to Arizona, *G. K. Gilbert*, 1873 (116), *Dr. J. B. Girard*, 1874. Flowers, August and September. Intermediate in size and color between the last and the following; well marked by its divaricate habit and its scanty flowers.

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ROBUSTUM, Engelm. P

2-3 lines thick at base, panicu

smaller than the pistillate ones; stamin

14-15 lines wide; anthers attached abo

Only on Pinus ponderosa, Colorado, New M

cirdum (Rothrock, 787), 1874. Flowers in Ju

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Pinus ponderosa, with lanceolate, acuminate

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FROM THE BO

ARCEUTHOBIUM ROBUSTUM, *Engelm. Pl. Fendl. p.* 59 ; *A. cryptopodum*, Engelm. Pl. Lindh. p. 214. — Stout, 2–4 inches high, 2–3 lines thick at base, paniculate, much branched, brownish-yellow to dark olive-brown ; staminate plants smaller than the pistillate ones ; staminate spikes with much-compressed, adpressed buds ; flowers mostly 3-parted, $1\frac{1}{4}$–$1\frac{1}{2}$ lines wide ; anthers attached above the middle of the ovate, acute lobes ; ripe fruit $2\frac{1}{3}$ lines long.

Only on *Pinus ponderosa*, Colorado, New Mexico, and Arizona ; Camp Apache (*G. K. Gilbert*, 1873) and Mount Graham (*Rothrock*, 787), 1874. Flowers in June. Fruit mature in August and September. The closely allied *A. occidentale*, Engelm., is distinguished by more elongated spikes, ventricose, divaricate buds of the staminate, mostly 4-parted, larger flowers, with lanceolate, acuminate lobes and anthers attached below their centre ; it also occurs on *Pinus ponderosa*, but more frequently on other conifers. Both persist for several years, the female plants always longer than the male.

FROM THE BOTANY OF CALIFORNIA, VOL. II., BY SERENO WATSON, CAMBRIDGE, 1880.*

PHORADENDRON, NUTT.

* Leaves foliaceous, mostly dilated upward from a narrow base. [105]

1. P. FLAVESCENS, *Nutt.* Branches terete, pubescent when young (as also the spikes), often a foot long or more: leaves oblanceolate to obovate or orbicular, $\frac{1}{2}$ to 2 inches long, obtuse, 3-nerved, at last glabrous : bracts connate into a short truncate cup : flowers depressed-globose, the calyx-lobes ciliate on the margin : staminate spikes opposite or verticillate, usually shorter than the leaves, 3–7-jointed, the numerous flowers mostly in 4 to 6 rows on each side and occupying nearly the whole joint, very fragrant with the odor of pond-lilies ; anthers transverse, opening by 2 pores : pistillate spikes usually opposite, shorter (rarely 5–6-jointed), the flowers (2 to 7 on each side of a joint) in not more than three series : berries white, 2 lines in diameter. — Engelm. Pl. Lindh. 212. *Viscum flavescens*, Pursh, the common glabrate spatulate-leaved southeastern form.

Var. MACROPHYLLUM, *Engelm.* Leaves large (2 to $2\frac{1}{2}$ inches long), broad, often 5-nerved, glabrate : flowers larger, in stout short-jointed spikes. — Wheeler's Rep. vi. 252.

Var. VILLOSUM, *Engelm. l. c.* Leaves small or middle-sized, orbicular to spatulate, permanently pubescent or tomentose : spikes slender, rather short. — *P. villosum*, Nutt. l. c. ; Engelm. Pl. Lindh. 212.

The latter variety is common throughout the State, chiefly on oaks, from S. California to Oregon, and eastward to New Mexico and Texas ; the former occurs on *Populus*, *Platanus*, *Fraxinus* and other trees, from S. California to New Mexico. Var. TOMENTOSUM (*Viscum tomentosum*, DC.) is found in Northern Mexico, on *Mimoseæ*, and is densely tomentose, with slender elongated spikes.

2. P. BOLLEANUM, *Eichler.* Puberulent, at length glabrous : branches terete, less than a span long : leaves thick, spatulate to linear, 6 to 12 lines long by 1 to 3 wide, nerveless, obtusish : spikes opposite or rarely in fours, with connate minutely ciliate bracts ; the staminate of two 6–12-flowered joints, the fertile of a single 2-flowered joint : anthers transverse, opening by pores : fruit white, $1\frac{1}{2}$ lines in diameter. — Fl. Bras. v^2. 134^m. *Viscum Bolleanum*, Seem. Bot. Herald, 295, t. 63. *P. pauciflorum*, Torrey, Pacif. R. Rep. iv. 134.

On conifers, mostly *Juniperus*, from the Geysers (*Brewer*) to San Felipe (*Palmer*) and into Arizona and Mexico ; also on Guadalupe Island, *Palmer*. A specimen on *Abies concolor*, from Duffield's Ranch near Auburn (*Bigelow*), is larger and with larger broader leaves.

* * Leaves reduced to short mostly connate scales : spikes opposite, mostly few-flowered.

3. P. CALIFORNICUM, *Nutt.* Pubescent or at last glabrous : branches terete, slender, a foot or two long : scales broadly ovate, acute, spreading : staminate spikes of 2 or 3 (rarely 5) flower-bearing joints, each with 2 to 6 ovate-subglobose flowers : anther-cells oblong, opening by a longitudinal slit : fertile spikes sometimes with nearly as many joints and flowers, the joints elongated (often an inch long) in fruit : berries reddish, 2 lines wide. — Pl. Gambel, 185 ; Engelm. Pl. Lindh. 213.

Southern California and Arizona, on various *Mimoseæ* and *Cassieæ*, *Larrea*, etc.

4. P. JUNIPERINUM, *Engelm.* Glabrous, stout, densely branched, 6 to 9 inches high : branches terete, the ultimate branchlets quadrangular : scales broadly triangular, obtusish, connate or distinct, ciliate : staminate spikes of a single 6–8-flowered joint (rarely two) : anthers transverse, opening by pores : pistillate spikes 2-flowered : berry globose, whitish or light red, $1\frac{1}{2}$ lines wide. — Pl. Fendl. 58.

Var. LIBOCEDRI, *Engelm.* Branches a foot long or more, slender : joints more elongated, the ultimate ones more sharply quadrangular.

On different species of *Juniperus*, from Truckee Pass southward and through S. Nevada and Arizona to New Mexico : the variety on *Libocedrus decurrens*, from the Yuba River to San Bernardino.

* The generic characters are omitted from this paper, having been given elsewhere. As stated on p. 104, only the following species of *Phoradendron* are found within the limits of the United States. — EDS.

* Cf. f. 375 of Bot. Wheeler, for this, fide Just, 1878, II. 221.

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PAPER

CEUTHOBIUM. A small genus, represent
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* Staminate flowers all (or nearly
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ARCEUTHOBIUM. A small genus, represented in S. Europe by a single species, and in America ran- [106]
ging from the northern border of the United States to Mexico, chiefly in the mountains.

* Staminate flowers all (or nearly all) terminal on distinct peduncle-like joints, paniculate.

1. A. AMERICANUM, *Nutt.* Slender, dichotomously or verticillately much-branched, greenish yellow ; staminate plants sometimes 3 or 4 inches long (¼ to a line thick at base), fertile plants much smaller: flowers small, the staminate a line broad or more, with ovate-orbicular acutish lobes, the pistillate a half to one line long : fruit 2 lines long. — Engelm. Pl. Lindh. 214, and Wheeler's Rep. vi. 252.

Only on *Pinus contorta* (and apparently *P. Banksiana* in the Saskatchewan region), from Wyoming to Oregon and southward to Colorado and California (Little Yosemite Valley, *Bolander*). Flowering mostly late in autumn apparently, but found by Parry in Wyoming in flower in July ; fruit mature in August and September. Its shoots creep along within the tissue of the bark on young branches of the pine, and in the autumn bud cut in the form of little knobs among the bud-scales at the end of three-years-old limbs, developing into flowering plants the next season. When once established it may continue to sprout from the same base for many (30 or more) years, causing hypertrophy of the wood and bark of the limb and often its final destruction. Fruiting and flowering branchlets are often seen in juxtaposition in the same whorl, but without leaf-bearing branchlets, and never in superposition.

The type of the genus, *A. Oxycedri*, Bieb., of the Old World, is allied to this, but distinguished from it and from all American species by its staminate flowers being all terminal on short branchlets and usually in threes, scarcely a line wide and with orbicular lobes, and by the much smaller oblong fruit, less than 1½ lines long. The northeastern *A. pusillum*, Peck, of the Adirondacks, growing on *Picea nigra*, also belongs to this section.

* * Staminate flowers axillary (with a terminal one), forming simple or compound spikes.

+ Slender, greenish-yellow : accessory branchlets of fruiting specimens flower-bearing.

2. A. DOUGLASII, *Engelm.* Similar to the last, but smaller, ¼ to 1 inch high : branches suberect, solitary, or with accessory ones behind (never beside) the primary ones : flowers in short (usually 5-flowered) spikes ; the staminate less than a line wide, with orbicular-ovate acutish lobes : fruit 2½ lines long. — Wheeler's Rep. vi. 253.

Var. ABIETINUM, *Engelm.* A larger form, 1 to 3 inches high (the fertile smaller), with spreading or even recurved few-flowered branchlets : staminate flowers 1¼ lines wide : fruit scarcely 2 lines long.

On *Pseudotsuga Douglasii*, from New Mexico to S. Utah and N. Arizona ; the variety on *Abies concolor*, in Sierra Valley (*J. G. Lemmon*) and S. Utah, *Parry*. Flowering apparently in October. Distinguished from the last by its usually smaller size, the superimposed (never verticillate) accessory branchlets, lateral flowers, and larger fruit. Its creeping stroma buds out all along the branch, and not between the bud-scales only as in the last. Another [107] variety, with very small fruit, is found on *Picea Engelmanni* in Northern Arizona.

+ + Stouter, greenish-brown : accessory branchlets of fruiting specimens mostly leaf-bearing.

3. A. DIVARICATUM, *Engelm.* Stouter than the last, 2 to 4 inches high and a line in diameter at base, olive green or pale brownish ; branches spreading, often flexuous or recurved : staminate flowers few and scattered or in 3–7-flowered spikes, a line wide, with ovate acute lobes : fruit 1½ to 1¾ lines long. — Pl. Wheeler, 1874, 16, and Wheeler's Rep. vi. 253. *A. campylopodum*, var., Engelm. Pl. Lindh. 114.

On *Pinus edulis* and *P. monophylla*, from New Mexico and S. Colorado to Arizona and S. Utah, and to be looked for on the latter species in S. California. Flowering in August and September. Intermediate in size and color between *A. Douglasii* and the following species, but well characterized by its slender habit, spreading growth, and small and rather scanty male flowers.

4. A. OCCIDENTALE, *Engelm.* Stout, 2 to 5 inches high, 2 to 2½ lines thick at base, paniculately much-branched : staminate plants brownish yellow, smaller, the pistillate commonly of a darker olive-brown color : staminate flowers in long dense spikes, often 9 to 17 on a single axis, their buds ventricose with the upper edge curved outward ; calyx 3–5- (usually 4-) parted, 1½ to 2 lines wide ; anthers sessile below the middle of the lanceolate acuminate lobes : fruit 2½ lines long.

Var. ABIETINUM, *Engelm.* More spreading and less densely branched, the accessory branches in the fruiting plant bearing fertile flowers as often as they do leaf-buds. — *A. abietinum*, Engelm. Proc. Amer. Acad. viii. 401.

On various conifers of the Coast Ranges and Sierra Nevada (*Pinus insignis*, *P. Sabiniana*, and *P. ponderosa*), from Salinas Valley and Walker's Basin to Oregon. It is the only American species found also on *Juniperus* (Silver Mountain, *Brewer*). The variety occurs on *Abies grandis* in the valley of the Columbia, *Hall*. Flowering in August and September.

The closely allied A. VAGINATUM, *Eichler* (*Viscum vaginatum*, HBK.), upon the pines of the Mexican mountains, of which only incomplete material has been collected, has shorter spikes and smaller mostly 3-parted staminate flowers with broader and shorter lobes. A. ROBUSTUM, *Engelm.*, on *Pinus ponderosa* in the Rocky Mountains and Arizona, has shorter spikes than *A. occidentale*, with shorter flat appressed staminate buds, the 3-parted flowers

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(opening in June) with shorter and broader lobes, bearing the anthers above their middle. Of the only remaining known species of this curious genus Seemann gathered on the Sierra Madre of Mexico a staminate specimen, in bud only, which is distinguished from all others by its greater thickness and by the long spikes of large verticillate 4-parted flowers, mostly 6 in a whorl. It may therefore bear the name A. VERTICILLIFLORUM.

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